

## **Application of Computer Aided Engineering Tools in Performance Prediction and Fault Detection of Mechanical Equipment of Mining Process Line**

**Authors :** K. Jahani, J. Razavi

**Abstract :** Nowadays, to decrease the number of downtimes in the industries such as metal mining, petroleum and chemical industries, predictive maintenance is crucial. In order to have efficient predictive maintenance, knowing the performance of critical equipment of production line such as pumps and hydro-cyclones under variable operating parameters, selecting best indicators of this equipment health situations, best locations for instrumentation, and also measuring of these indicators are very important. In this paper, computer aided engineering (CAE) tools are implemented to study some important elements of copper process line, namely slurry pumps and cyclone to predict the performance of these components under different working conditions. These modeling and simulations can be used in predicting, for example, the damage tolerance of the main shaft of the slurry pump or wear rate and location of cyclone wall or pump case and impeller. Also, the simulations can suggest best-measuring parameters, measuring intervals, and their locations.

**Keywords :** computer aided engineering, predictive maintenance, fault detection, mining process line, slurry pump, hydrocyclone

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